Cowley showed photostats of an Italian mathematical manuscript of the Middle Ages, containing three of these problems.

May 18: Indoor picnic. The following officers were elected for 1922-1923: President, Harvia Wilson '23; vice-president, Erneste Goodman '23; secretary-treasurer, Mary Hall '24; members of executive committee, Professor Cowley, Jeannette Kinne '23.

PROBLEMS AND SOLUTIONS.

EDITED BY B. F. FINKEL, OTTO DUNKEL, AND H. P. MANNING.

Send all communications about Problems and Solutions to B. F. FINKEL, Springfield, Mo.

PROBLEMS FOR SOLUTION.

[N. B. Problems containing results believed to be new, or extensions of old results, are especially sought. The editorial work would be greatly facilitated if, on sending in problems, proposers would also enclose any solutions or information that will assist the editors in checking the statements. In general, problems in well-known text-books, or results found in readily accessible sources, will not be proposed as problems for solution in the MONTHLY. In so far as possible, however, the editors will be glad to assist members of the Association with their difficulties in the solution of such problems.]

2986. Proposed by C. F. GUMMER, Queen's University.

A triangle is inscribed in a circle. The arcs into which it divides the circumference are bisected at points forming the vertices of a second triangle. A third triangle is derived in the same way from the second, and so on. Prove that each set of alternate triangles approaches a limiting position.

2987. Proposed by PHILIP FITCH, North Denver High School, Colorado.

A flexible chain of length l and uniform weight is fastened at one end to the ridge of a roof with pitch p and slant height L. If the eaves of the roof are at a height h from the ground and the coefficient of friction between the chain and the roof is μ, how long will it take, after releasing the chain, for the highest end to reach the ground?

2988. Proposed by PHILIP FRANKLIN, Harvard University.

Prove, geometrically, that if in an ellipse the tangent at P cuts the directrices in Z, Z' and the remaining tangents from Z and Z' to the ellipse meet at T, PT is normal to the ellipse at P. (An analytic proof is given in the *Journal of the Indian Mathematical Society*, vol. 13, 1921, p. 234.)

2989. Proposed by L. M. HOSKINS, Stanford University.

How should the following questions be answered, assuming that the place referred to is in latitude 34° 8′?

A building twelve feet high has been erected 49 inches south of our lot line. We desire to erect a wall on our line six inches in thickness. (*a*) How high can we build the wall and have it wholly within the shadow cast by the building? (*b*) How high can we build the wall and have it within the shadow cast by the building during the winter months?

2990. Proposed by R. M. MATHEWS, Wesleyan University.

If a circle be bitangent to a conic, its center is on one of the axes of the curve.

2991. Proposed by E. J. OGLESBY, New York University.

Sum the infinite series,

$$1+\frac{3x^2}{2!}+\frac{4x^4}{4!}+\frac{6x^6}{6!}+\cdots,$$

where the numerators of the coefficients form a series of numbers whose third differences are all equal to 2.